CLAIMS

What is claimed is:

1. A method, comprising:

depositing a catalyst particle on a surface of a substrate to define a deterministically located position;

growing an aligned elongated nanostructure on the substrate, an end of the aligned elongated nanostructure coupled to the substrate at the deterministically located position;

coating the aligned elongated nanostructure with a conduit material;

removing a portion of the conduit material to expose the catalyst particle;

removing the catalyst particle; and

removing the elongated nanostructure to define a nanoconduit.

2. The method of claim 1, further comprising forming an aperture through the substrate that is contiguous with the nanoconduit.

3. The method of claim 1, wherein growing the aligned elongated nanostructure includes growing the aligned elongated nanostructure substantially perpendicular to a plane defined by the surface of the substrate using a glow discharge DC plasma of an ammonia/acetylene gas mixture and the aligned elongated nanostructure includes a carbon nanofiber.

4. The method of claim 1, wherein growing the aligned elongated nanostructure includes growing the aligned elongated nanostructure substantially non-parallel to a plane defined by the surface of the substrate using a glow discharge DC plasma of an ammonia/acetylene gas mixture and the aligned elongated nanostructure includes a carbon nanofiber.

5. The method of claim 1, wherein growing the aligned elongated nanostructure includes growing the aligned elongated nanostructure substantially perpendicular to a plane defined by the surface of the substrate and the aligned elongated nanostructure includes a silicon nanowire.

6. The method of claim 1, wherein coating the elongated nanostructure includes

conformally depositing SiO_2 using silane-based plasma enhanced chemical vapor deposition.

7. The method of claim 1, wherein coating the elongated nanostructure includes conformally depositing with Si_3N_4 using plasma enhanced chemical vapor deposition.

8. The method of claim 1, wherein coating the elongated nanostructure includes conformally depositing a metal using sputtering.

9. The method of claim 1, wherein removing the portion of the conduit material includes reactive ion etching the portion of the conduit material with CHF_3/O_2 in a radio frequency plasma

10. The method of claim 1, wherein removing the catalyst particle includes etching the catalyst particle with nitric acid.

11. The method of claim 1, wherein removing the elongated nanostructure includes plasma etching the elongated nanostructure with oxygen.

12. The method of claim 2, wherein forming the aperture includes reactive ion etching the substrate with SF_6/O_2.

13. The method of claim 1, further comprising depositing an additional nanoconduit material to decrease a diameter of the nanoconduit.

14. The method of claim 1, further comprising depositing a secondary material within the nanoconduit.

15. The method of claim 14, wherein the secondary material includes a metal and depositing the secondary material includes filling the nanoconduit with the metal by electroplating.

16. The method of claim 14, further comprising reducing gas pockets within the

nanoconduits before depositing.

17. The method of claim 14, further comprising removing another portion of the conduit material thereby utilizing the conduit material as a secondary template to replicate the elongated nanostructure with the secondary material.

18. An apparatus, comprising a substrate and a nanoconduit material coupled to a surface of the substrate, wherein the substrate defines an aperture and the nanoconduit material defines a nanoconduit that is i) contiguous with the aperture and ii) aligned substantially non-parallel to a plane defined by the surface of the substrate.

19. The apparatus of claim 18, wherein the nanoconduit is aligned substantially perpendicular to the plane defined by the surface of the substrate.

20. The apparatus of claim 18, wherein the substrate includes silicon nitride.

21. The apparatus of claim 18, wherein the nanoconduit material includes SiO_2.

22. The apparatus of claim 18, wherein the nanoconduit includes a circular cross section.

23. The apparatus of claim 18, wherein the nanoconduit includes a non-circular cross section.

24. The apparatus of claim 18, wherein the aperture includes a circular cross section.

25. The apparatus of claim 18, wherein the aperture includes a non-circular cross section.

26. An apparatus, comprising a substrate and a nanoreplicant structure coupled to a surface of the substrate.

27. The apparatus of claim 26, wherein the nanoreplicant includes an elongated nanostructure.

28. The apparatus of claim 27, wherein the elongated nanostructure is aligned substantially non-parallel to a plane defined by the surface of the substrate.

29. The apparatus of claim 28, wherein the elongated nanostructure is aligned substantially perpendicular to the plane defined by the surface of the substrate.

30. The apparatus of claim 26, wherein the substrate includes silicon nitride.

31. The apparatus of claim 26, wherein the nanoreplicant structure includes a metal.

32. The apparatus of claim 26, wherein the nanoreplicant structure includes a circular cross section.

33. The apparatus of claim 26, wherein the nanoreplicant structure includes a non-circular cross section.